SCIENCE.

FRIDAY, DECEMBER 3, 1886.

COMMENT AND CRITICISM.

THIS IS THE SEASON of governmental reports, and we are forcibly reminded by them of the intricate and complex administrative system that has been developed in the United States. Most of these reports are of real interest to the community, but all save the most important of them are never read. Yet some of the reports by minor officers contain a great deal of valuable information, and merit notice. One such is the report of the adjutant-general of the army, who touches on the condition of the militia of the various states. Inasmuch as our regular army is too small to merit the name, and since we must depend on our volunteer forces in case of war, the topic is of some importance. The adjutant-general approves of state encampments as a means of drilling and training the militia, but, soldier-like, criticises the prevailing tendency to make an encampment a sort of picnic for the state officials. To be of any real benefit, General Drum says that state encampments should be of ten days' duration, and established at a sufficient distance from the homes of the members of the command to overcome the social and business influences which otherwise interfere with military duties. The camp must be divested of any holiday appearance, and the time devoted to instruction and practice in skirmish and battalion drills, and guard duty, target-practice, etc.; for, says General Drum, "as most of the fighting of the future must be done in open order, a thorough acquaintance with the skirmish drill is of the highest importance." He also disapproves of mere exhibition drills, and favors arming the state troops with the best and newest arms and ammunition.

The superintendent of the naval academy, Commodore Sampson, devotes the major portion of his report to an argument in favor of shortening the present six years' course of study at that institution. He desires to have the fifth and sixth years of the course, now devoted to service on cruising vessels, done away with, and the cadets commissioned at the end of the fourth year, instead of, as now, at the end of the sixth, on the ground that the country gains no additional advantage from the last two years. Commodore Sampson also shows that under the existing system, which restricts each congressional district to a candidate every six years, one-third of the boys are never eligible for admission to the academy, because of the various restrictions as to age; whereas, if the course were reduced from six years to four, each congressional district would have an appointment once in four years, and all the boys of the country would be eligible at some time. At the last annual examination, 163 candidates reported; but only 86 fulfilled the requirements, and were entered as cadets.

But of the reports thus far made public, with the possible exception of the treasury statements, that of the postmaster-general will attract most attention. Using statistics gathered in 1884 — since which time our postal service has grown immensely — by the international bureau of the Universal postal union, Mr. Vilas shows that our postal machinery far exceeds that of any other nation on the globe. It is estimated that last year one hundred million more letters were mailed here than in Great Britain, — long the leading letter-writing nation, — and nearly that number more than were mailed in Germany, France, and Austria combined. Of pieces of matter mailed, the annual proportion per inhabitant is 19 in Germany, 57 in Great Britain, and 66 in the United States. At the close of the last fiscal year there were in this country 53,614 post-offices, and 497 stations or branch-offices: of this number, only 2,265 are so-called presidential offices. It is a curious and suggestive fact, that, of the new offices established during the year, over sixty per cent were located in fourteen southern states and Indian Territory. During the year the carriers handled 1,949,520,599 pieces of mail matter, an increase over the previous year of 11.75 per cent. About four millions of dollars were transferred on postal orders, and 1,118,820 special delivery stamps were used. The gross revenue for the year amounts to $43,936,000, leaving a deficiency of nearly $7,000,000 to be provided for by appropriation.

FIGURES ARE SOMETIMES STRANGE things, but no less convincing than strange. They frequently force a man to assent to a proposition against his will, and in opposition to what he has persuaded himself is true. The latest case in point, and the one we have in mind, is a contribution of the London *Economist* to the discussion on bad times and depression. Great Britain has been commiserating itself on its unprosperous financial condition, and John Bull has loudly asseverated that he is losing money. In the face of this comes the *Economist* with the statement, that, instead of having grown poorer, Great Britain has, during the last decade, saved and invested at least one thousand million pounds sterling, a sum one-third greater than the national debt. This immense sum is believed to be far within the truth, since it takes no account of the large sums annually spent in improvements, nor of the very considerable sum sent out of the country to secure foreign and colonial investments. The *Economist* proves its assertion by showing that within ten years the country has invested the following sums: house property, £400,000,000; home railways, £186,000,000; joint stock companies, £200,000,000; colonial loans, £80,000,000; loans to English local authorities, £72,000,000, — in all, £938,000,000. The *Spectator*, in noticing this fact, thinks that it is not so much, after all; for it is only a saving of "a hundred million pounds sterling a year, or a fifth more than is paid in national taxation, — probably not two shillings in the pound of national income, and certainly not a fourth of the income of those who pay the income tax." This may be so; but practically it may make considerable difference in the expenditures of a people, to find, that, instead of annually running behind, they are really getting ahead each twelvemonth. But be these figures what they may, it seems to be an undoubted fact that a large section of the British population feel that they grow poorer year by year; and, until we can determine more precisely what weight attaches to the statistics prepared by the *Economist*, we are unwilling to say emphatically that such feeling is without any justification in fact.

FEW ORGANIZED CHARITIES are so uniformly successful and so richly deserving as the Children's aid society of New York City, of which Mr. Charles L. Brace is the efficient and judicious executive officer. In describing the work of the society at the annual meeting of the trustees, Mr. Brace detailed the principles of the society and the results attained by proceeding upon them. The principles were defined as the absolute necessity of treating each youthful criminal or outcast as an individual, and not as one of a crowd; the immense superiority of the home or family over any institution in reformatory and educational influence; the prevention of crime and pauperism by early efforts with children, and the vital importance of breaking up inherited pauperism by putting almshouse children in separate homes; and, most of all, the immense advantage of 'placing out' neglected and orphan children in farmers' families. The records of the city police courts show how these principles work in practice. While in thirty years the city's population has increased from about six hundred and thirty thousand to nearly a million and a half, the number of girls committed for petty larceny has fallen in the same period from over nine hundred to less than two hundred and fifty. In the same time the commitments of female vagrants have decreased from 5,778 to 2,565.

The industrial schools, employing over one hundred teachers, and giving instruction to ten thousand pupils, are the most important branch of the society's work. Mr. Brace claims that "the industrial schools act especially in preventing the growth of a race of drunkards, as the children become elevated above the habit. The enormous decrease of some fifty per cent in cases of drunkenness known to the police during the past ten years is one proof of this. The remarkable decrease of some twelve and a half per cent in all crimes against person and property during the past ten years, as well as the decrease from previous years, is one of the most striking evidences ever offered of the effects of such labors as those of this society and of many similar charities. It has gone on regularly in years both of business depression and prosperity. It proves that such labors are diminishing the supply of thieves, burglars, drunkards, vagrants, and rogues." Another original and useful branch of the society is its lodging-houses, which combine the various functions of school, workshop, emigration agency, and lodging-house. Each child pays for his support by labor or money. The liberal benefactions of Miss Wolfe, J. J. Astor, and Mrs. R. L. Stewart, who have each put up large buildings for these purposes, have greatly aided the society. There

are now six lodging-houses, and they have sheltered during the year over 11,000 children at an average cost per capita of $47.65.

A SIGNIFICANT ILLUSTRATION of the interest taken by Russians in anthropological research and the zeal and activity of Russian scientific bodies is furnished by the annual report of the Society of lovers of natural science anthropology and ethnology, read at its annual meeting in Moscow on the 27th ult. In the course of the past year the society has held fifty meetings, at which there were read one hundred and thirty papers and reports; it has organized and sent into the field seventeen scientific expeditions, including one to the Black Sea, one to the valley of the Ob in western Siberia, and one to the Caucasus; it has made valuable collections in all parts of the empire; and, finally, it has published eight volumes of memoirs embodying the scientific work of its members. Six medals of gold and six of silver were awarded at the annual meeting to members of the society who had especially distinguished themselves during the year in scientific research.

OPINIONS SEEM TO DIFFER as to the dangers connected with the use of cocaine. Dr. William A. Hammond does not believe that there is any danger of a person becoming so addicted to its use that he cannot discontinue it at any time. Dr. J. B. Mattison, on the other hand, looks upon it as a drug which already has entangled within its toils a number of persons, who are as unable to stop its use as if the drug were opium instead of cocaine, and for whose relief a proper course of treatment is necessary. The statistics thus far seem to indicate that physicians and apothecaries are especially prone to its unrestricted use, as, up to the present time, they form the larger part of its victims.

THE DISCOVERY of petroleum in Scotland, as mentioned in the *Glasgow herald*, is interesting in connection with the discoveries made many years ago of petroleum in small quantity in English coal-measures; but it is very probable that this locality, like those in England, will not yield oil in commercial quantity. It is worth while, however, to call attention to the fact that the distillation of oil from 'bog-head' coal and the Midlothian shales, with which this new pit is probably connected, led eventually to the production of petroleum in the United States.

THE *Lancet* records the case of a young girl who had attacks exactly resembling delirium tremens from the effect of tea-leaves which she was in the habit of chewing. We have already called attention to the many and varied disorders which may occur as the result of the excessive use of strong tea, and have no doubt that many persons suffering from dyspepsia and palpitation of the heart would find these symptoms to disappear, or at least be markedly diminished, if they would discontinue the excessive use of tea as a beverage.

IN COMMENTING UPON the extraordinary efficiency claimed for the Marchant steam-engine, which has been attracting considerable attention in England of late, *Science* of Oct. 29 intimated that in the tests made there might possibly have been some source of error, which would be revealed by further trials under more satisfactory conditions. Conclusive tests recently made in the presence of representatives of *Engineering*, the *Electrical review*, and other technical journals, prove that the amount of coal consumed for each horse-power per hour, as shown by the brake, was four pounds, instead of eight-tenths of a pound, as shown at previous trials.

MEASLES APPEARS TO BE very prevalent in New York City. For the week ending Nov. 20, there were 253 cases reported, of which 38 were fatal. During the first two years of the war of the rebellion there were 38,021 cases of this disease in the army, of which 1,864, or about 1 in 31, were fatal. Bartholow regards this as an underestimate. He thinks, that, if all the complications and sequels were taken into account, the mortality would be at least 1 to 5. The number of deaths in Brooklyn for the same period was but 4. It is difficult to estimate the probable number of cases of this disease in either city, the mortality varying so much at different times, and for reasons which are not ascertainable, although it is doubtless true that only a very small proportion of the cases are reported to the health authorities in any of our cities While New York is nearly free from small-pox, and has been for a long time, — but one case in many months, — Brooklyn appears to have the disease to a considerable extent, some forty or more cases having been reported within the past month. With so much of this disease in a neighboring city, it will be very strange if New York continues to be exempt.

MUSCLE-READING BY MR. BISHOP.

MR. W. I. BISHOP, a young American, who has given a number of exhibitions of muscle-reading in Europe and this country, gave a private performance recently in Boston. As considerable discussion has ensued in the daily press as to what the exhibiter did or did not do, and as the newspaper reports have been misleading, we present a brief account of the actual performances at Boston.

The principal feats were four in number: 1. The discovery of a knife hidden in an adjoining room, and the re-enactment of a pretended murder with the knife; 2. Writing on a blackboard the number of a bank-note; 3. Finding an object hidden at a distance from the hotel; 4. Playing a piece of music on the piano. While doing these feats, Mr. Bishop was blindfolded, and ascertained what he was to do through unconscious communications from a person who knew exactly what was to be done. There is no reason to doubt the fairness of the conditions, or to suspect collusion.

1. In the watched absence of Mr. Bishop, the Rev. James Freeman Clarke took a knife and pretended to stab Dr. C. C. Everett; he then, accompanied by Dr. Minot J. Savage, hid the knife. The performer returned and was blindfolded; he then placed Dr. Clarke's hand upon his own, and essayed unsuccessfully to find the knife. At the performer's request, Dr. Savage took hold of Dr. Clarke's wrist of the same hand Mr. Bishop was touching. With this double guidance, Mr. Bishop went quickly to the place where the knife was hid, found it, returned, stopped in front of Dr. Everett, and copied with his own hand but imperfectly the stabbing done by Dr. Clarke. During the whole time his hand was close to or actually touching Dr. Clarke's.

2. Dr. William James looked at the number on a bank-bill which comprised three digits unknown to Mr. Bishop. The latter drew some large squares upon a blackboard, one for each digit. He was again blindfolded, and, taking Dr. James's hand in his, stood in front of the board, and, while his guide fixed his attention upon the squares and the digits, he drew the three digits in succession correctly.

3. An open carriage seating four persons, with two quiet horses, was brought to the door of the Hotel Vendome, where the exhibition was given. A party of three gentlemen, all well known, had previously hid a scarf-pin in a private house a few blocks off. The three gentlemen, accompanied by Mr. Bishop, who was blindfolded and had a black hood over his head, got into the carriage. Each of the four had hold of the long piece of wire which Mr. Bishop had provided. Two of the gentlemen placed their hands upon Mr. Bishop's head. Mr. Bishop drove off, and, after a few false turns, came to the right house, got out there, and accompanied by his guides, and touched by at least one of them, found the pin, and then returned to the hotel. Two circumstances probably facilitated this performance. First, when the party returned, one of them touched Mr. Bishop, who was blindfolded; and the latter, while his guide was looking at the large map of Boston hanging on the wall, and thinking of the house where the pin was, put his own finger upon the right spot on the map. Mr. Bishop may have thus gained some general knowledge as to where the locality was. Second, the street on which he started runs east and west; there was a bright afternoon sun; it is probable that the light was sufficient to inform him at least as to the points of the compass. However, these sources of information, though helpful, were insufficient to show exactly where the pin was hid.

4. Mr. Bishop asked Mr. Whitney to think of some well-known melody, and suggested something from 'Il Trovatore.' Mr. Whitney adopted the suggestion, and informed the audience of his selection. Mr. Bishop placed himself in front of the piano, and, touching Mr. Whitney's hand, proceeded to strike the right notes on the keyboard. His guide's attention was concentrated on the melody, and on the movements of Mr. Bishop's hand over the keys.

Several other feats were attempted, but failed. The failures were presumably due to the guides not being good subjects.

According to the unanimous opinion of the most competent judges, the explanation of the feats accomplished is simple and obvious, and has already been given as regards Mr. Bishop personally by Professor Preyer. If the descriptions given above are recalled, it will be noticed, 1°, that nothing was done except when there was contact between the performer and the guide; and, 2°, that success required nothing but the execution of some movement on Mr. Bishop's part. Thus, in the first feat he had to go to a certain place, take a knife, return with it and strike a blow; in the second, to make certain marks upon a blackboard; in the third, to move, in part by the guided power of horses, to a certain place, and there move his hand to a particular spot and take hold of an object; in the fourth, merely to strike certain piano-keys. In spite, therefore, of the apparent diversity of things done, there was no real variety, and there is only one thing to explain. It is this: how did Mr. Bishop ascertain what movements or motions he was to execute?

That we have no reason to suspect trickery has already been said. We must also seek some means of communication of which the guides were unconscious. Mr. Bishop claims that he received his impressions by direct mind-reading, or, as it is now often called, telepathy ; and a certain number of persons appeared inclined to accept that explanation. But when Mr. Bishop's arguments are examined, they vanish : and in his replies in the newspapers to his critics he has insidiously and assiduously avoided discussion of any of the real objections to his assertion that his feats are done by genuine mind-reading ; so that we are compelled to think that his real purpose is to make his exhibitions assume a marvellous character in the mind of the public, or else that he really believes in his assertion, which, may we be pardoned for saying frankly, implies a notable ignorance of physiology and psychology, — a degree of ignorance not rare in itself, though rarely coupled with so much audacity of opinion.

The only explanation which we can consider tenable is the simple one of muscle-reading, already advanced by Professor Preyer. As already stated, Mr. Bishop was in every case in contact with his guide, and his feat was to make the motion which the guide knew he ought to make. In accordance with Preyer's view, we think that slight pressures of the guide's hand were exerted, that these were perceived by Mr. Bishop, and sufficed for his guidance. That the explanation is ample is apparently not questioned by any of those who have followed the recent discussions upon muscle-reading. It is now very properly held by, we believe, all qualified judges, that, when there is contact between the performer and the guide, there is no adequate reason to assume the occurrence of true mind-reading. Mr. Bishop, however, thinks the contrary, and says the impressions on his mind are telepathic, and not sensory, in origin. By a common mental flaw, Mr. Bishop, at least in our judgment, assumes a remote and improbable cause, instead of a near and probable one. To our mind it would be a like reasoning which said that love exerts a powerful attraction : stones are not drawn toward the earth by gravity, but by the love they have for the earth.

We may conclude by saying that we consider Mr. Bishop an exceptionally good muscle-reader, and regret that the mysteries with which he seeks to envelop his exhibitions give an effect of charlatanism, entirely distasteful to an honorable lover of scientific truth. We have therefore expressed ourselves more unreservedly than would have been fitting in the discussion of a subject concerning which an honest divergence of opinion were possible among scientific men.

A SUBMARINE VOYAGE.

THE submarine torpedo-boat shown in the accompanying illustration has made frequent trial trips, during the past few months, in the Hudson River, off the foot of 86th Street, this city ; and the degree of success attained has been highly gratifying to her owners, the Submarine monitor company. A brief description and illustration of the boat were given in *Science* of Aug. 27, but several changes have been made in details of her construction and equipment since that date, so that she now presents a somewhat different appearance. A pair of horizontal rudders has been attached at the bow, so that the boat may be submerged ' on an even keel,' that is, in a horizontal position, instead of at an angle, as formerly. The boat can be submerged by means of the rudders only when she is in rapid motion, rising immediately to the surface if the engine stops, or if the rudders are changed from an inclined position, as in the engraving, to a horizontal position. When not in motion, the boat may be submerged or raised to the surface by taking in or forcing out water-ballast.

A fin, or vertical projection, has been attached to the upper part of the boat, amidships, extending ' fore and aft,' so as to guard the manhole and conning-dome or pilot-house from collision with the keel of a ship when passing under its bottom. A depression in the fin, between the manhole and the dome, is intended to afford a sort of resting or holding place for the boat when under a ship's keel while releasing torpedoes. A pair of sleeves or gloves of india-rubber project from the boat abaft the dome, one of which is shown in the picture. By inserting his arm in one of these sleeves, the captain of the boat can release the torpedoes at the proper moment, the torpedoes being attached by tripping devices to the outside of the boat.

The proposed method of using the boat in actual warfare is as follows : she will be submerged by means of the rudders or water-ballast, or both. When at the proper depth, she will approach the vessel to be destroyed, and, as she passes beneath it, two torpedoes will be released, each attached to one end of a rope. The torpedoes will be lightened by cork or an equivalent, so that they will rest against the bottom of the vessel, one on each side of the keel. The boat will then be run ahead a safe distance, and the torpedoes exploded by electricity through wires leading from the boat, There has been no torpedo practice yet with the Peacemaker, as the new boat is called, but the intention of her owners is to make some experiments in that direction soon.

In the illustration the side of the boat is broken